

College Student Intentions to Participate in Internet-Based Health Research

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Abstract

To explore factors associated with college students' intentions to participate in Internet-based health research, data were collected from 502 undergraduate students enrolled in introductory-level business courses at a large midwestern university. Findings suggest that intentions to participate in Internet-based research are influenced by one's perceptions of social norms related to research participation and the extent to which one regularly discusses personal health information with others. Researchers planning to use the Internet for conducting health research and needs assessments among college populations may find study recruitment strategies focusing on social norms to be effective.

Introduction

Since its introduction, health education practitioners and researchers have considered the potential for the Internet to support their initiatives. Today, the Internet is widely used for health-related purposes by diverse groups of people and searches for health information have been described as being among the most popular activities of those connected to the World Wide Web (Pealer, Weiler, Pigg, Miller, & Dorman, 2001). While concerns still exist about the extent to which some communities have access to the Internet, trends indicate that Internet users are beginning to resemble the demographics of the nation's population (Mustanski, 2001).

Given the popularity of the Internet among the general population and the extent to which Internet-related and other technologies have become standard for those associated with most academic institutions, excitement also exists in the field about the potential for the Internet to serve as a valuable tool for research. This has been explored by a wide range of social and behavioral scientists, most indicating

promise in terms of the feasibility of the Internet for this purpose. Some researchers have suggested that the Internet, particularly when compared to traditional survey research mechanisms, may support the collection of more reliable and valid data, may result in higher item-completion rates, and may facilitate the production of research instruments that are more visually appealing and that appear less complex to the actual participant (Houston & Fiore, 1998; Krantz & Dalal, 2000; Musch & Reips, 2000; Mustanski, 2001; Soetikno, Mrad, Pao, & Lenert, 1997; Turner & Turner, 1998).

In one of the most comprehensive studies to date that assessed the Internet as a tool for research by comparing data collected from the Internet to data obtained by more traditional paper-pencil methods, Gosling and colleagues (2004) found that data collected by the Internet were similar to those collected by other methods in terms of the diversity of the samples and the extent to which data appeared to be obtained in a valid manner, and suggested that the presentation format used for the Internet-based study, when compared to those of a paper-based instrument, did not affect the nature of a participant's responses. Krantz and Dalal (2000) and Mustanski (2001) found similar patterns in the extent to which Internet-based samples tend to be more ethnically diverse than those often reported from more traditional forms of data collection.

Some researchers have also published work suggesting that there are challenges to the use of the Internet for research. Siah (2005) summarized four areas of concern with the use of the Internet for research, including challenges to the generalizability of findings, the potential for participant fraud, increased potential for measurement error, and challenges to research ethics. Mustanski (2001) provides a set of recommendations for attending to these challenges in Internet-based research and suggests that while some risks seem unique to the Internet, they often are similar to challenges inherent in traditional forms of research.

While some has been written about the advantages and challenges of using the Internet for specific types of research, less is known about the utility of the Internet as a tool for conducting research on health-related issues. One recent study conducted by Austin and colleagues (2006) found that the psychometric properties of measures used to assess psychological outcomes in an Internet-based study were similar to those of a paper-based administration of the same instrument. In a large study conducted by Reece and colleagues (2005) using Internet-based daily diaries to collect data related to condom use of over 1,000 participants, the investigators reported that the Internet was a useful tool for retaining participants in health-related research that was time

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intensive and that required the reporting of large amounts of highly sensitive behavioral data. In a study examining issues related to Hepatitis C, Rhodes and colleagues (2001) found the Internet to be a useful tool for obtaining valid data and suggested that the nature of the Internet may help to create better linkages between research and practice by linking participants to providers and other Internet-based resources that are related to the issue under study.

However, little research has been published that has focused specifically on the use of the Internet to assess the health-related behaviors of young adults, particularly college students. This is surprising given the availability of Internet-based technologies at most academic institutions, the extent to which college students use the Internet for academic and other purposes, and since researchers have routinely sought to collect health-related data from this population using other, more traditional forms of research. While documentation of technological approaches to research among college students has been minimal, some in the health field have explored the feasibility of using such approaches with this population.

In one of the few studies in this area, Pealer et al. (2001) determined that a web-based system for collecting health risk behavior data from college students was highly feasible. In addition, they suggested that using an Internet-based approach appeared to be an option for research that was not only methodologically strong, but also appealing to college students.

While previous research would support moving forward in this area, relatively no studies in health education have explored the factors associated with the likelihood that a college student would participate in an Internet-based health research study if provided the opportunity. Additionally, little is known about the characteristics of students, and the characteristics of the research process itself, that support the ability of researchers to obtain diverse and representative samples when using the Internet. The popularity and accessibility of the Internet among this population provides a rationale for exploring their attitudes about the Internet, its use for research, and their intentions regarding research participation. A better understanding of these factors will support efforts to maximize the potential of the Internet as a tool for health-related research among college students.

Theoretical Framework

The Theory of Planned Behavior (TPB) (Ajzen, 1991) provides a valuable theoretical foundation for studying the intentions of individuals to participate in certain behaviors. The TPB is an extension of the Theory of Reasoned Action (TRA), which places value in the constructs of attitudes and social normative perceptions as important predictors of intentions to perform a behavior (Fishbein, 1967; Montano & Kasprzyk, 2002). This theory has been utilized widely in numerous studies of intentions to perform health behaviors, in areas ranging from diet (Conner, Norman, & Bell, 2002; Wood-Baker, Little, & Brownell, 2003) to exercise (Blanchard

et al., 2003; Blanchard, Courneya, Rodgers, & Murnaghan, 2002; Conn, Tripp-Reimer, & Maas, 2003) and sexual activity (Albarracin, Johnson, Fishbein, & Muellerleile, 2001; Bryan, Fisher, & Fisher, 2002) to tobacco use (Bursey & Craig, 2000; Grantt, 2001), among others. While these behaviors are distinct from the behavior of using the Internet for health-related research, across these studies the TPB has demonstrated itself to be a valuable tool for conceptualizing and measuring one's intentions to perform a range of behaviors and was therefore used in order to situate the notion of health-related Internet-based research within a well established theoretical framework.

Study Purpose

The purpose of this study was to better understand the factors associated with intentions of college students to participate in Internet-based health research studies if provided the opportunity. Two specific questions guided this research, including: 1) what are the demographic characteristics of students associated with their intentions to participate in Internet-based health research? and 2) to what extent do attitudes toward research, toward the Internet, social norms regarding the sharing of personal health information, and perceived behavioral control over decisions related to Internet use, influence the intentions of students to participate in Internet-based health-related research?

Methods

Data Collection

A cross-sectional survey was administered to 556 undergraduate students enrolled in one of four sections of an entry-level business course (introduction to business) at a large Midwestern university during a single semester. Among 556 students, 502 (90.3%) completed the survey. Since this particular course on the campus where data were collected is introductory in nature and taken by students from diverse disciplines who have yet to declare an academic major, it was used for recruitment given the likelihood that it would provide a sample of participants with a diverse range of academic interests. All study protocols were approved by the Institutional Review Board of Indiana University-Bloomington.

Measures

The 104-item survey included the following measures: demographics; computer use characteristics; attitudes toward research and attitude toward the Internet; social norms related to discussing personal health information, participating in research, and using the Internet; perceived behavioral control related to participating in Internet-based research; and intentions to participate in Internet-based health-related research. The sub-scales used for each of these constructs generally demonstrated an acceptable internal

consistency and ranged from a high of .96 (intentions) to a low of .44 (social norms for research participation). The psychometric properties and sample questions of each scale are presented in Table 1.

Attitudes toward Research.

The attitudes toward research were measured on a 5-point Likert type scale (0 = strongly disagree to 4 = strongly agree) on the following five items; "I believe that research is important to society," "I believe that students should participate in research sponsored by their university," "I think that most research is a waste of time," "I feel a responsibility to share my opinions when given the opportunity to participate in research," and "I think that my university focuses too much on research."

Attitudes toward the Internet.

The attitudes toward the Internet were measured on a 5-point Likert type scale (0 = strongly disagree to 4 = strongly agree) on the following five items; "I enjoy using the Internet," "I find the Internet to be easy to navigate," "I feel the Internet is useful in my personal life," "I feel the Internet is useful in my academic life," and "Using the computer makes my life easier."

Norms of Personal Health Discussions.

The norms were measured on a 4-point Likert type scale (0 = never to 3 = daily) on how frequently respondents discuss with their three closest friends about the following fifteen health-related topic areas; general health, exercise habits,

Table 1

Psychometric Properties and Sample Items of the TPB Construct

Scale	Number of Items	Response Categories (score)	Sample Item	Cronbach's Alpha
Attitudes toward research	5	Strongly disagree (0) to strongly agree (4)	I believe that research is important to society.	.602
Attitudes toward the Internet	5	Strongly disagree (0) to strongly agree (4)	I feel that the Internet is useful in my academic academic life.	.937
Norms of personal health discussions	15	Never (0) to daily (3)	How frequently do you discuss your eating habits with your three closest friends?	.873
Norms of research participation	4	Strongly disagree (0) to strongly agree (4)	Most of my friends would complete an Internet-based survey if given the opportunity	.446
Perceived behavioral control	4	Not at all important (0) to very important (3)	How important is access to computers to you when deciding whether or not to participate in an Internet-based survey on a health topic?	.827
Intention to participate in Internet-based research	15	Not at all likely (0) to very likely (3)	How likely would you be to complete an Internet-based survey on condom use?	.959

eating habits, body image, family history, mental health, stress, violence, tobacco use, alcohol use, illicit drug use, general sexual health, sexual activity with others, condom use, and masturbation.

Norms of Research Participation.

The norms of research participation were measured on a 5-point Likert type scale (0 = strongly disagree to 4 = strongly agree) on the following four items; "Most of my friends would complete an Internet-based survey if given the opportunity," "Most people disregard emails about participating in surveys," "My friends would laugh at me for completing a survey that wasn't required for class," and "My friends would participate in an Internet survey if I told them about it."

Perceived Behavioral Control.

The perceived behavioral control was measured on a 4-point likert type scale (0 = not at all important to 3 = very important) on how important are the following four items to respondents when deciding whether or not to participate in an Internet-based research study on a health topic; convenience, privacy, access to a computer, and other commitments (i.e., classes, activities, etc.)

Intention to Participate in Internet-Based Health Research.

The intention was measured on a 4-point likert type scale (0 = not at all likely to 3 = very likely) on whether respondents would participate in Internet-based research on the following fifteen health-related topic areas; general health, exercise habits, eating habits, body image, family history, mental health, stress, violence, tobacco use, alcohol use, illicit drug use, general sexual health, sexual activity with others, condom use, and masturbation.

Data Analysis

T-tests and analysis of variance were conducted to assess the existence of differences on subscales (i.e., attitudes, social norms, perceived control, intentions) according to the demographic characteristics of the participants. Pearson correlations were used to examine the associations among the TPB constructs. Also, a three-step hierarchical multiple regression analysis was conducted to assess the extent to which these variables were predictive of intentions to participate in the Internet-based health research if provided the opportunity. A p-value of less than .05 was considered significant for all statistical tests performed.

Results

Description of Participants

The majority of the 502 participants were Caucasian (79.9%, $n = 402$), under 21 years of age (91.0%, $n = 457$), and in their first two years of college (91.8%, $n = 461$). The sample included relatively even proportions of males (59.4%, $n = 298$) and females (40.0%, $n = 201$). The demographic profiles of gender and ethnicity of this sample were similar to those of the university population from which the sample was drawn. Given the small numbers of students in each of the ethnicity categories other than Caucasian, which were far fewer than would be needed for statistical analysis, the ethnicity variable was dichotomized into Caucasian and others for the majority of analyses to be presented. As predicted, students represented a diverse range of ten different academic divisions and majors from across the university given the introductory nature of the course in which they were enrolled.

Participant Computer Use Characteristics

Participants were active users of computers and the Internet. The vast majority (81.3%, $n = 408$) reported owning a personal computer, and 37.5% ($n = 188$) reported spending between three and five hours daily using the Internet. A large number of participants (57.0%, $n = 286$) reported previous experience as a participant in an Internet-based research study. There were no gender differences on computer ownership, hours spent on the Internet, and previous experience on Internet-based research participation. Caucasian students were more likely to have computers than students in other ethnic groups ($\chi^2 = 23.781$, $df = 1$; $p = .000$) while students in other ethnic groups spent more time on the Internet than Caucasian students ($\chi^2 = 12.187$, $df = 2$; $p = .002$). Also, younger students were more likely to have previously participated in an Internet-based research study as compared to older participants ($\chi^2 = 8.301$, $df = 2$ $p = .016$).

Attitudes

Participants completed two sets of attitude-related measures: 1) attitudes toward research and 2) attitudes toward the Internet. Women ($t = 4.54$, $df = 484$, $p = .000$), and those describing themselves as Caucasian ($t = 2.32$, $df = 487$, $p = .021$) held more positive attitudes toward the value and importance of research. These same groups, women ($t = 2.30$, $df = 486$, $p = .022$) and Caucasian students ($t = 2.41$, $df = 489$, $p = .018$) also held more positive attitudes toward the Internet. In addition, those who had previous experience participating in an Internet-based research study showed more positive attitudes toward research ($t = 2.16$, $df = 366$, $p = .032$) and the Internet ($t = 2.58$, $df = 366$, $p = .010$).

Subjective Norms

Subjective norms were assessed using two measures: 1) perceptions of peer norms regarding Internet-based research and 2) norms related to discussing health-related issues and concerns with peers. Less than one-third (24.1%, $n = 121$) positively endorsed the notion that their friends would participate in Internet-based health research if given the opportunity; a larger proportion (43.2%, $n = 217$) endorsed just the opposite that their peers would not participate in such research; 31.7% ($n = 157$) of the respondents were not sure. Women ($t = 5.71$, $df = 490$, $p = .000$) and those who previously participated in Internet-based research ($t = 2.50$, $df = 366$, $p = .013$) were more likely to endorse the existence of social norms supportive of peer participation in Internet-based research.

Participants reported the frequency with which they held discussions with their three closest friends across a range of 15 health-related topics. The most frequently discussed health topics were "managing stress," which 43.2% ($n = 217$) of participants discussed daily, "alcohol use habits" which 36.3% ($n = 182$) of students discussed daily, and "nutrition habits," which 35.5% ($n = 178$) of students discussed daily. The most infrequent health issues discussed daily were related to condom use (12.4%, $n = 62$) and family disease history (12.0%, $n = 60$). Across all health topics, Caucasian students were more likely to report frequent discussions on health-related topics than students from other ethnic groups ($t = 3.66$, $df = 496$, $p = .000$); more frequent discussions were also reported by younger students ($F = 4.86$, $df = 497$, $p = .008$).

Perceived Behavioral Control

The component of perceived behavioral control that emerged as being most likely to influence a participant's decision to participate in an Internet-based study was "convenience", which was rated as "important or very important" by 52.8% of participants ($n = 265$). Also rated as "important or very important" by a large proportion of participants (50.4%, $n = 253$), was the extent to which subjects had other school-related commitments (i.e. classes or extracurricular activities) and the extent to which their participation in an Internet-based health study would be "private."

Predictors of Intentions to Participate in Research

Correlations among the TPB constructs were examined before developing a predictive model of college students' intentions to participate in an Internet-based research study. Table 2 indicates that there were high correlations among the variables of attitudes, social norms, perceived behavioral control, and intentions to participate in Internet-based research. No multi-collinearity problem was detected. A three-step hierarchical multiple regression analysis was conducted by entering three categories of variables (demographics;

previous experience participating in an Internet-based research study; attitudes, social norms, and perceived behavioral control) in order to explore the extent to which these variables were predictive of students' indication of their likelihood to participate in an Internet-based health research study if provided the opportunity.

Demographic variables held no predictive capacity in the first model, explaining less than 1% of students' intention to participate in Internet-based research. When previous experience participating in an Internet-based research study was added in the second model, this variable retained its predictive capacity, but explained only about 2% of the intentions. In the final model, when the TPB constructs were entered, previous participation in an Internet-based study no longer remained as a significant predictor and the TPB constructs explained 19.1% of students' intention to participate in Internet-based research. The three statistically significant variables in the final model included gender, the extent to which participants discussed health-related topics with their three closest friends, and their perceptions of social norms related to Internet-based health research. The overall model explained 21.5% of students' intention to participate in Internet-based research. Table 3 provides an overview of the hierarchical multiple regression results.

Discussion

These results provide an initial look into the factors associated with the intentions of college students to participate in health-related research activities conducted via the Internet. These insights may be helpful to academic researchers and other health education professionals wishing to better utilize the Internet as a research tool or as a tool for conducting health-related assessments among this population.

Given the limited amount of research in this area, there were no clear hypotheses about the extent to which the demographic characteristics of students would influence their intentions to participate in Internet-based health research although some previous work has suggested that the Internet is a tool for increasing the ethnic diversity of participants (Goslin et al., 2004; Krantz & Dalal, 2000; Mustanski, 2001). However, this sample was primarily Caucasian, which may have limited our ability to detect differences between students from different ethnic groups. Those students that identified as Caucasian and female held more positive attitudes about research and attitudes about the Internet. However, in the final regression model, male students were more likely to report intentions to participate in Internet-based health research if provided the opportunity. Since the study asked whether the respondents would participate in an Internet-based study on various health topics including possibly sensitive topic areas such as sexual health and illicit drug use, this might have influenced these findings. Studies show that men are more willing to participate in studies on sensitive topics than women (Bjarnason &

Table 2

Correlations Among TPB Constructs

	Attitudes toward research	Attitudes toward the Internet	Norms of personal health discussions	Norms of research participation	Perceived behavioral control	Computer ownership (Own = 1)	Intention to participate in Internet-based research
Attitudes toward research	1.00						
Attitudes toward the Internet	.389***	1.000					
Norms of personal health discussions	-.003	-.057	1.000				
Norms of research participation	.312***	.209***	.055	1.000			
Perceived behavioral control	.257***	.107*	.043	.196***	1.000		
Computer ownership (Own=1)	.065	.143**	-.025	-.008	.064	1.000	
Intention to participate in Internet-based research	.217***	.171***	.197***	.384***	.106*	-.052	1.000

* $p < .05$. ** $p < .01$. *** $p < .001$. $n = 502$

Adalbjarnardottir, 2000; Durant, Carey, & Schroder, 2002; Wiederman, 1999).

While computer ownership was not a predictor of intentions to participate in research, it is important to note that over 85% of the sample owned a personal computer, making it likely that differences on this variable were difficult to detect. Computer ownership among college students throughout the country may vary by region or by type of campus. Considering the large proportion of participants who owned a personal computer in this sample, these results may not be generalizable to other student populations. Similar challenges with regard to the generalizability of actual Internet-based research have also been suggested by Siah (2005). Additionally, data were collected using convenience sampling although were intentionally collected in a course that is known to attract a wide range of students exploring

potential majors in an attempt to recruit an academically diverse sample.

Even though previous experience participating in an Internet-based research study was a significant variable in the second hierarchical model, this factor lost its predictive capacity when the TPB constructs were included in the final model. Among the TPB constructs, the social norms construct was the only construct of the TPB to retain some level of statistically significant predictive capacity in the final regression model and this was the case for a two-factor measure of social norms. One limitation of this finding is that the measure for the social norms factor related to research participation had a low level of reliability in this sample, perhaps limiting the predictive capacity of this construct to some extent. Student perceptions of the social norms associated with sharing personal health information,

Table 3

Predictors of Student Intentions to Participate in Internet-Based Health Research

Predictors	Model 1		Model 2		Model 3	
	B	Std. Err.	B	Std. Err.	B	Std. Err.
Gender (Male=1)	.006	.088	-.002	.087	.206*	.084
Age	.006	.077	-.007	.077	.053	.071
Ethnicity (Caucasian=1)	.148	.115	.138	.114	.070	.105
Participated in Internet-based survey before (Yes=1)			.272**	.103	.177	.096
Attitudes toward research					.072	.071
Attitudes toward the Internet					.062	.044
Norms of personal health discussions					.256***	.063
Norms of research participation					.377***	.054
Perceived Behavioral Control					.001	.047
Computer ownership (Own=1)					-.125	.210
Constant	2.042	.181	1.867	.192	-.422	.390
R-square (Adjusted R-square)	.005 (-.004)		.024 (.013)		.215 (.193)	
R-square change (Adjusted R-square change)			.019 (.017)		.191 (.180)	

* p<.05. ** p < .01. ***p<.001. df = 355

measured by the extent to which they routinely participated in health-related discussions with their peers, appears to be an important issue in one's likelihood of participating in a health-related study if provided the opportunity. One consideration of this is that students likely to participate in health-related research would also be more likely to discuss health issues with their peers and, as a result, may provide more valid data given that they have thought more about their behaviors and health-related attitudes. On the other hand, this finding could suggest that students who do not discuss health-related issues with peers may be less likely to participate in health research, or that those who do discuss issues with peers could be more likely to provide more socially-desirable responses, both of which would introduce significant bias to studies with this population.

Also, predictive of intentions to participate in Internet-based health research were perceptions of social norms related to research participation, regardless of the research topic. That social norms were predictive of intentions, and not those related to attitudes toward the Internet or attitudes toward research, was surprising. Considering that the majority of the study participants owned computers, it may be that the participants had considerable exposure to the Internet, were comfortable with using the Internet, and had generally positive attitudes toward the Internet. As a result, a lack of variance on this measure may have influenced the extent to which attitudes were predictive of intentions.

The findings offer insight for those planning to use the Internet for health-related research among this population. Findings suggest that focusing on social norms in study

recruitment strategies may be beneficial. Whether through electronic-based recruitment (i.e., E-mail) or more traditional recruitment (i.e., flyers), researchers may find it helpful to use messages that present participation in health-related Internet based research as a normative event. Additionally, the use of peer-recruitment strategies may be helpful given the apparent importance that social norms may have on one's decision to participate in such a study. Although the ethnic diversity of this study sample was limited, given the extent to which other researchers have suggested that the Internet can be used to increase ethnic diversity of participants (Gosling et al., 2004; Krantz & Dalal, 2001; Mustanski, 2001), researchers should consider using recruitment messages that are grounded within the cultural norms of diverse communities and that take advantage of the availability of the websites of diverse campus groups.

These findings also have implications for the potential use of the Internet not only for research, but for subsequent health education interventions. Given that over 80% of participants reported owning a computer and approximately 40% reported spending over three hours per day online, campus health educators may want to consider enhancing or expanding traditional health education programs to include Internet-based components. These may be particularly effective for more sensitive health-related behaviors, such as condom use, which was reported among this sample to be one of the least likely topics to be discussed with peers. Given that peer-based interventions have long been used by campus health educators, considering the extent to which the Internet can be used to enhance existing interventions may be beneficial.

While much remains unknown about the strengths and limitations of Internet-based research, college students may represent one population for which a continued understanding of these issues will be important. Conclusions of this study suggest that college students' high degree of computer access, frequent use of computers, and the extent to which they appear to be routinely discussing some health-related issues with peers, collectively support the extent to which the Internet is a useful tool for conducting research among this population, particularly when study protocols include efforts to normalize research participation among this population. Future studies that document the methodological processes guiding Internet-based research among this population will be particularly helpful as the field moves forward in this area.

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